

## Maker Mask Assembly Instructions

**Note:** If you are using hairspray to help adherence to the glass bed of your 3D printer during the printing process, be sure to remove any residue prior to assembly.



*List of parts and labels pictured above*

- |                                    |                                     |                                    |                                      |
|------------------------------------|-------------------------------------|------------------------------------|--------------------------------------|
| <b>A</b> – Mask                    | <b>E</b> – Retention Triangle       | <b>I</b> – Side Grommet (x2)       | <b>M</b> – Top Fasteners (x2)        |
| <b>B</b> – Front Valve Filter Tray | <b>F</b> – Side Valve (x2)          | <b>J</b> – Filter Bottom Tray (x2) | <b>N</b> – Back Strap Fastener       |
| <b>C</b> – Front Valve Housing     | <b>G</b> – Valve Flap (x2 optional) | <b>K</b> – Filter Spring (x2)      | <b>O</b> – Buckle                    |
| <b>D</b> – Front Retainer          | <b>H</b> – Side Filter Tray (x2)    | <b>L</b> – Filter Cap (x2)         | <b>P</b> – Back Strap Clasp Fastener |

## Assembling the Front Valve



*From Top L- Bottom R: Parts B, C, a piece of filter, E, and D*

1. Cut filter material to fit in **Front Valve Housing (C)** – use **Front Valve Filter Tray (B)** as size guide, cutting filter material to be slightly smaller than **Front Valve Filter Tray (B)** so that it fits within **Front Valve Housing (C)**.
2. Place front filter material atop **Front Valve Housing (C)**, and snap **Front Valve Filter Tray (B)** into place on top of atop **Front Valve Housing (C)**. Tray should be secure in place.



*Filter Material is seen in between the Front Filter Tray (B) and the Front Valve Housing (C)*

3. On opposite side of **Front Valve Housing (C)** (the side that will be on the outside of mask), align **Front Valve Flap and Pin (E)** over front opening hole so “braille dot” on middle of flap is in the center of the open hole, and the pin “keyhole” is aligned so that Pin can be pushed in.



Aligning the flap (E)



Adding the pin (E)

4. Use thumb to pressure pin into place. Flap should be tight, but still allow air to exhale.
5. Push assembly through front hole on mask, tight enough that the flap portion of assembly is fully coming through to front.



6. The **Front Retainer Ring (D)** should have a “braille dot” that goes on the top (facing up to forehead) of the assembly and is flush against mask. Simply turn the Front Retainer Ring clockwise, and it will snug into place and should not be loose.
7. The Entire Front Valve should now be tightly in position.



### Add a Valve Flap (Optional)

8. **Optional Step:** Glue smooth side of **Valve Flap (G)** to smooth side of **Side Valve (F)**.  
**Note:** Use a single (pinhead size) drop of superglue at the pointed end of the flap.
9. **Optional Step:** Repeat with second **Valve Flap (G)** and second **Side Valve (F)**.

### Assemble Side Filters

10. Cut filter material to fit atop the **Filter Bottom Tray (J)**— use the **Filter Cap (L)** as size guide, cutting slightly smaller than **Filter Bottom Tray** so it fits within the **Filter Cap (L)**
11. Position **Side Valve Triangles (F)** on Mask with top of the triangle facing up and push in until you hear it click. The **Side Valve Retainer (F)** will protrude out from the mask so that it can fit the filter trays. Repeat for each side.



*The Side Valve Triangle (F) shown attached to the Mask (A).*

**Optional Step:** You can add a thin layer of hot glue to the **Side Valve Triangle** prior to positioning the filter trays.

12. Position the **Side Filter Tray (H)** up with the **Side Valve Triangles (F)** of the exterior of **Mask (A)**. When attached correctly the filter is facing outward away from the mask.
13. Place **Grommet (I)** over **Side Valve Retainer (F)**. Ensure smooth side of Grommet faces down against Filter Holder. Position **Grommet (I)** so that the narrow part of the opening is at the top of triangular **Side Valve Retainer (F)**.





*The **Grommet (I)** assembly shown with the **Side Filter Tray (H)** and the **Side Valve Triangle (F)** attached to the mask in the background.*

**Note:** There is a little raised dot (similar to a braille cell) marking the top of the triangular valve retainer piece. Line it up with the top of the triangle then twist the Grommet until it locks and **Side Filter Tray (H)** is securely attached to **Mask (A)**.



*Correct installation of the grommet.*

14. Install **Filter Bottom Tray (J)** into **Side Filter Tray (H)** with smooth side facing out



**Note:** the **Filter Bottom Tray (J)** is slightly larger than **Filter Cap (L)** and has larger honeycomb pattern.

15. Place filter material on **Filter Bottom Tray (J)**.

16. Place **Filter Spring (K)** on top of **Filter Bottom Tray (J)**, ensuring wide side faces out.



*Seen above: Filter material is placed on the Filter Bottom Tray (J) and the Filter Spring (K) is being added to hold filter in place.*

17. Complete side filter set up by snapping the **Filter Cap (L)** over top of Side Filter Assembly.

18. Repeat on other side.

19. Test side valves by pressing mask tightly over face and inhaling. Exhale to test front valve.

20. Spray Respirator with Disinfectant (see Final Disinfectant instructions at the end of this document).

### Assemble Back Strap

21. Use the heat gun (or lighter) to shape **Buckle (O)**. Apply heat to the smooth side, focusing on narrow sections left and right of Buckle center.

22. Bend Buckle into soft arc as shown in the picture below (smooth side will be facing in and ribbed side facing out). Once shaped into soft arc, briefly submerge in bowl of cold water to harden **Buckle (O)**.



Buckle **(O)** bent into soft arc shape

23. Next, use heat gun (or lighter) to shape pointed center tip of **Buckle (O)** into a hook shape (picture below). Ensure smooth side faces in and textured side faces out. Using the newly formed hook, attach **Buckle (O)** to loop on at the bottom of the **Mask (A)**.



*Buckle (O) loop (approximately 1 mm gap needed) attached to the **Mask (A)**.*

24. Use your heat gun (or lighter) to curl hooks on **Back Strap Fasteners (N)**. Confirm that **Back Strap Fasteners and clasp (N)** and (P) mate properly.



**Back Strap Fastener (N)** shown with hook shape.

25. Take your elastic strap and feed into the opening on the **Buckle (O)**. Feed approximately 1" of strap through opening. Repeat process to attach second strap to opposite end of Buckle.



26. Repeat by feeding the other end of your elastic strap through the openings of your **Back Strap Fastener and Clasp (N & P)**.



Assembly showing the elastic strap through the opening of the **Back Strap Fastener and Clasp (N & P)**.



## Assemble Top Strap

27. Repeat the process to create hooks using your heat gun (or lighter) on the **Top Fasteners (M)**. There will be two.
28. Using the newly formed hooks, attach the Top Fasteners (M) to the Mask. These can be found on either side above the **Side Filter Trays**.
29. Attach a new strap to a **Fastener (M)**. Feed approximately 1" of strap through opening. Attach opposite end of strap to second **Fastener (M)**. Feed approximately 1" of strap through opening.



## Apply Rubber Gasket to the edge of the Mask

30. Apply the rubber gasket (weather stripping) material to the edge of the **Mask (A)**.
31. Starting where the mask fits the chin, feed the skinny edge of the rubber gasket onto the edge of the Mask. Press down firmly to ensure that the Gasket seals fully into the Mask.
32. Once the seal has been fed all the way around the Mask, cut the rubber gasket with a razor or scissors leaving as small a gap between the ends as possible.

**Optional Step:** Use the hot glue gun to fill in any gap between ends of the Gasket.



## Final Disinfection

The body of the Mask is now complete. Perform a final disinfection by immersing the entire mask in mix of denatured alcohol, water, and HDX detergent for a minimum of 60 seconds. **Be sure to vigorously oscillate Mask while immersed to dislodge all bubbles and ensure complete disinfection of all surfaces.**

## Integrate Filters

The Makers Mask accepts filters of various types. We recommend a HEPA-based or carbon activated filter. Melt-blown polypropylene filters are used in surgical masks and are safe. **Note:** Some HEPA filters contain borosilicate glass and may pose a health risk.

### Customize fit to user face shape/size

To check the fit of completed Maker Mask, hold Mask over mouth and nose with one hand while pulling top strap over top of head with opposite hand. Next, use both hands to hook lower straps behind head. Tighten or loosen straps as needed.

End users can customize the fit of the respirator to face.

1. Heat water in a container to 90° C (approximately 190° F)
2. Place the respirator with facial gasket down, and side and front filters facing up. Holding Mask level, lower gasket and first inch of Mask (A) body into water (**Do not lower filters or valves into water.**)
3. Immerse for 10 seconds, remove from water and apply against face. Use opposite hand to form fit Mask to face. Immerse in water again if needed to make Mask pliable.

**Caution: DO NOT** repeat water immersion more than three times without allowing mask to cool to room temperature. Repetition of the heated fit process in quick succession may cause the mask to release the gasket or warp – rendering the mask unsafe.